TEXTS AS RESOURCES, *not programs*

KEITH McNAUGHT

argues the case against overuse of mathematics texts in classrooms.

Two of my mathematics education students on practicum have rung me in the past week. One, in a Year 1 class, was told she was not making enough use of the mathematics textbook as her key teaching tool, and that she was spending too much time on manipulative materials and conceptual work, instead of 'getting on with it'. Another, in a Year Six, was told to cease playing instructional mathematics games, as once his practicum finished they would not happen again, they'd be back to the text, and this would only cause disappointment for the children.

Australian primary schools are mirroring international trends where textbooks become the pseudo curriculum (Cai, Watanabe & Jane Lo, 2002). Some schools have adopted a publication series, and mandate its use at every year level. The use of a mathematics text is historically connected to a view of mathematics based on a direct instructional approach (Alsup, 2003), where the learner is viewed as the empty vessel, and mathematics as a series of facts and theories to learn and know (McGeehan, 2001). There are fundamental beliefs that by working through the text, mathematical knowledge will be imparted. Self-perpetuating beliefs in this system rely on the assessment model being taken from the same publication, so that if one does well on the text tasks, one will do well in the assessment, thus making the text appear effective in the acquisition of knowledge and skills. Textbook dependent mathematics programs are riddled with problems. Textbooks are frequently in

place in schools simply as an administrative measure to move the cost of photocopying (implying the same teachers would purchase and use blackline masters/worksheets) to parents, in the form of a text on the book list. Texts provide teachers and other stakeholders with a sense that mathematics instruction is occurring in a planned and systematic manner. None of the quality textbook based mathematics programs advocate a program of work based on solely text activities. Rather, their teacher-manuals direct the use of manipulative materials, connect to other resources, and so forth. There are a number of quality publications, and in those, the teacher manuals provide a rich range of diverse teaching activities, which clearly expect and encourage teachers to plan a unit of work as to use the text as a resource; the reality is that this is seldom the case. In working in schools, a number of teachers have commented that the manual was 'too expensive to purchase', so had not even been sighted by teachers.

Best practice

Best practice in primary mathematics education features:

- student centred learning (not everyone doing the same work at the same time);
- problem solving strategies and focus (not solely word problems, but authentic tasks);
- higher order thinking skills (not just task completion);
- rich tasks (not superficial/busy work);
- real life application (not artificial exercises);
- students having fun and being really engaged with mathematics (such as occurs with: instructional games, using materials, working collaboratively, finding the work purposeful, feeling stimulated by the task);
- manipulative materials at all ages to develop concepts and understandings (teaching concepts not content);
- meaningful, open-ended tasks (mathematics being relevant, reflective of our real-life every day uses of mathematics to solve problems);
- mathematics which is motivating because it's interesting and relevant (not a belief that getting the answers right will be motivation enough).

Real life mathematics

The stark contrast between mathematics instruction and mathematics in real-life is worth noting. In a primary classroom, up to 90% of the instructional time is spend on algorithmic work and repetitive exercises, most utilising low level thinking skills. Less than 5% of time is spent on mental mathematics, and much of the mental mathematics is low-skill level repetition. De Nardi (2004, p. 8) notes, 'At least 75% of adult calculations are carried out mentally'. In real life, we seldom work with algorithms, and the vast bulk of 'lived' mathematics work is taken from 'working mathematically' curriculum strands, with an equally large bulk of our mathematics being completed mentally. Mental mathematics is often enormously more efficient than the use of algorithms. Many textbooks focus an excessive number of pages (and pages) of practice on written algorithms.

Without doubt, there is a core group of teachers who are textbook orientated because it is less work. There is little or no preparation. Conversely, 'real' teaching (in any subject area) is very time consuming and personally demanding on already stretched teachers. Most textbooks provide a full program of work, which can be photocopied and highlighted, and

are carefully (and cleverly) cross-referenced to various outcomes and objectives. Some of the series sold nationally are the same books, but the set for every state has different cross-referenced links to state curriculum outcomes and pointers. So, in reality, this is nothing more than a political and expedient exercise to make the books saleable, rather than having activities that match outcomes. The dependence on a textbook to provide the content and learning activities for a mathematics program, and the notion of every child working on the same page at the same time, are directly oppositional to the national and international focus on outcomes based education. The same teachers who make heavy use of a mathematics textbook series are more than likely to use textbooks in other learning areas. Student teachers report of whole days within primary classrooms where the students work from text to text (or worksheet to worksheet) all day. Textbooks are now very 'market sensitive' in their appearance, frequently making use of full colour printing, and providing pictures and graphics to increase their visual appeal.

School strategy

The deep and fundamental issue is a school based philosophical base to the best ways in which mathematics (or any other subject) should be taught. A school must have a clearly articulated vision about the nature and role of teaching and learning that will occur within the school, and the methodologies and resources that are appropriate. When this occurs, textbooks assume their correct place, as a valuable resource that forms part of the total mathematics program, but not the mathematics program. Following on from this, it may well be that staff dialogue about the use of textbooks is the catalyst for in-depth discussions about teaching and learning practices within the school.

Several options exist for schools. A number of schools have placed a mathematics textbook levy amount on their school booklist, which is used to purchase sets of textbooks for use in the classroom; over a relatively short time, a school can purchase two or three different texts which can be used by a class as part of mathematics resources. Many pages within textbooks are excellent as resource pages to reduce the need to photocopy work.

Principals need to review the construction of booklists, and establish a reference committee to review the selected items. Examples exist of Year Three booklists containing eight textbooks. This should ring alarm bells for a class of seven to eight year old students and clearly indicates that the bulk of their day will be textbook work. A school based review committee would have recognised this as excessive. Frequently, the book list represents the desires of the individual teacher, who may not be teaching the class they are preparing the booklist for. This perpetrates the scenario of 'obligation' where teachers inherit a booklist, then feel they need to justify the purchase of items by using them; parents erroneously judge teacher competence by how many pages are completed (and marked) from the books.

In Australia, we desperately need teachers, principals and schools to challenge the textbook driven mathematics curriculum, and to reposition texts as resources, not programs. There are some excellent publications, and, used well, can be valuable resources. We've all experienced that audible groan with, 'Please open your book to page 64,' and it is a signal to which we need to respond. Apart from every other concern related to textbook dependent teaching, if students are not enjoying mathematics, a great deal of damage is occurring.

References

Alsup, J. (2003). New classroom rules to promote pre-service elementary teachers' mathematics learning. *Education, Chula Vista, 123* (3).

Cai, J., Watanabe, T. & Jane Lo, J. (2002). Intended treatments of arithmetic average in US and Asian school mathematics textbooks. *School Science and Mathematics, 102* (8), 391–404.

De Nardi, E. (2004). *Avanti Mental Maths.* Elite Education: Western Australia.

McGeehan, J. (2001). Brain-compatible learning. *Green Teacher, 64*, 7.

Keith McNaught
University of Notre Dame (Fremantle, WA)
<kmcnaught@nd.edu.au>